(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization

International Bureau





(43) International Publication Date 24 June 2004 (24.06.2004)

PCT

(10) International Publication Number WO 2004/053501 A2

(51) International Patent Classification7:

G01P

(21) International Application Number:

PCT/US2003/039435

(22) International Filing Date:

11 December 2003 (11.12.2003)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

60/432,589

11 December 2002 (11.12.2002)

- (71) Applicant (for all designated States except US): ARI-ZONA BOARD OF REGENTS, acting for and on behalf of, ARIZONA STATE UNIVERSITY [US/US]; c/o Arizona Technology Enterprises LLC, Brickyard Suite 601, Room 691AA, 699 S. Mill Avenue, Tempe, AZ 85281 (US).
- (71) Applicant and
- (72) Inventor: FRASCH, Wayne, D. [US/US]; 15013 S. 24th Way, Phoenix, AZ 85048 (US).

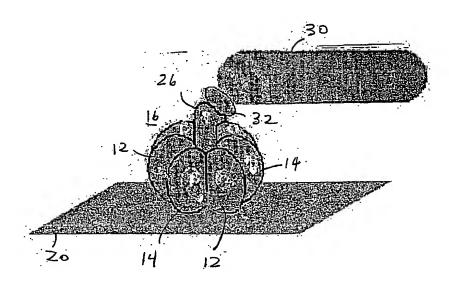
- (74) Agent: ATKINS, Robert, D.; Quarles & Brady Streich Lang LLP, One Renaissance Square, Two North Central Avenue, Phoenix, AZ 85004 (US).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GO, GW, ML, MR, NE, SN, TD, TG).

Published:

without international search report and to be republished upon receipt of that report

[Continued on next page]

(54) Title: POLARIZATION-ENHANCED DETECTOR WITH GOLD NANORODS FOR DETECTING NANOSCALE ROTA-TIONAL MOTION AND METHOD THEREFOR



(57) Abstract: A nanoscale motion detector attaches a gold nanorod (30) to the rotating arm (26) of a molecular structure (10) to cause the nanoparticle to rotate. The molecular structure is an F1-ATPase enzyme. The gold nanorod is exposed to a light source. The long axis of the gold nanorod scatters red light when the nanorod is in a first position. The short axis of the gold nanorod scatters green light when the nanorod is in a second position. A polarizing filter filters the red and green light to detect the rotational motion by observing alternating red and green lights. A detection DNA stand (50) is coupled between the gold nanorod and the molecular structure. The detection DNA strand hybridizes with a target DNA strand (58) if the target DNA strand matches the detection DNA strand to form a structural link between the molecular structure and gold nanorod.

2004/053501 A2



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.